CLAIMS

What is claimed is:

1      1.     A method for repairing a transmission line having a section which

2   comprises a first fiber having a positive dispersion with respect to wavelength

3   transmitted through the section and a second fiber having a negative dispersion with

4   respect to wavelength transmitted through the section, the method comprising:

5       inserting a third fiber in the section, wherein the third fiber has an absolute

6   value of dispersion per unit of length smaller than the absolute value of dispersion per

7   unit of length of the first and the second fibers.


1      2.     A method as in claim 1, wherein, before inserting the third fiber, the

2   first and second fibers are adjacent to each other so that light traveling through the

3   section travels through one of the first and second fibers and then through the other of

4   the first and second fibers.


1      3.     A method as in claim 1, wherein the third fiber has first and second ends

2   and, after inserting the third fiber, the first end of the third fiber is adjacent to an end of

3   one of the first and second fibers, and the second end of the third fiber is adjacent to an

4   end of the other of the first and second fibers, so that light traveling through the section

5   travels through one of the first and second fibers, then through the third fiber, and then

6   through the other of the first and second fibers.


1      4.     A method as in claim 2, wherein the third fiber has first and second ends

2   and, after inserting the third fiber, the first end of the third fiber is adjacent to an end of

3   one of the first and second fibers, and the second end of the third fiber is adjacent to an

4   end of the other of the first and second fibers, so that light traveling through the section

5   travels through one of the first and second fibers, then through the third fiber, and then

6    through the other of the first and second fibers.

1    5.    A method as in claim 1, wherein first and second repeaters are disposed

2    along the transmission line, the section being defined as a portion of the transmission

3    line between the first and second repeaters.

1    6.    A method as in claim 2, wherein first and second repeaters are disposed

2    along the transmission line, the section being defined as a portion of the transmission

3    line between the first and second repeaters.

1    7.    A method as in claim 3, wherein first and second repeaters are disposed

2    along the transmission line, the section being defined as a portion of the transmission

3    line between the first and second repeaters.

1    8.    A method as in claim 4, wherein first and second repeaters are disposed

2    along the transmission line, the section being defined as a portion of the transmission

3    line between the first and second repeaters.

1    9.    A method as in claim 1, wherein the section is underwater at a depth of

2    greater than or equal to 1000 meters.    *February 8 '01*

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1    10.    A method as in claim ~~2~~ 1, wherein the section is underwater at a depth of

2    *less* ~~greater~~ than or equal to 1000 meters.

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1    11.    A method for repairing a transmission line having a section which

2    comprises a first fiber having a positive dispersion with respect to wavelength

3    transmitted through the section and a second fiber having a negative dispersion with

4    respect to wavelength transmitted through the section, a trouble occurring in the first

5    fiber to thereby divide the first fiber into a first portion and a second portion, the

6    method comprising:

7    inserting a third fiber in the section between the first and second portions to

8    repair the trouble, wherein the third fiber has an absolute value of dispersion per unit of

9    length smaller than the absolute value of dispersion per unit of length of the first fiber

10   and the second fiber.

1    12.    A method as in claim 11, wherein, before inserting the third fiber, the

2    first and second fibers are adjacent to each other so that light traveling through the

3    transmission line travels through one of the first and second fibers and then through the

4    other of the first and second fibers.

1    13.    A method as in claim 11, wherein the third fiber has first and second

2    ends and, after inserting the third fiber, the first end of the third fiber is adjacent to an

3    end of one of the first and second portions, and the second end of the third fiber is

4    adjacent to an end of the other of the first and second portions, so that light traveling

5    through the section travels through one of the first and second portions, then through

6    the third fiber, and then through the other of the first and second portions.

1    14.    A method as in claim 12, wherein the third fiber has first and second

2    ends and, after inserting the third fiber, the first end of the third fiber is adjacent to an

3    end of one of the first and second portions, and the second end of the third fiber is

4    adjacent to an end of the other of the first and second portions, so that light traveling

5    through the section travels through one of the first and second portions, then through

6    the third fiber, and then through the other of the first and second portions.

1　　　15.　A method as in claim 11, wherein first and second repeaters are disposed
2　along the transmission line, the section being defined as a portion of the transmission
3　line between the first and second repeaters.

1　　　16.　A method as in claim 12, wherein first and second repeaters are disposed
2　along the transmission line, the section being defined as a portion of the transmission
3　line between the first and second repeaters.

1　　　17.　A method as in claim 13, wherein first and second repeaters are disposed
2　along the transmission line, the section being defined as a portion of the transmission
3　line between the first and second repeaters.

1　　　18.　A method as in claim 14, wherein first and second repeaters are disposed
2　along the transmission line, the section being defined as a portion of the transmission
3　line between the first and second repeaters.

1　　　19.　A method as in claim 11, wherein the section is underwater at a depth of
2　greater than or equal to 1000 meters.

1　　　20.　A method for repairing a transmission line having a section which
2　comprises a first fiber having a positive dispersion with respect to wavelength
3　transmitted through the section and a second fiber having a negative dispersion with
4　respect to wavelength transmitted through the section, a trouble occurring in the second
5　fiber to thereby divide the second fiber into a first portion and a second portion, the
6　method comprising:
7　　　　inserting a third fiber in the section between the first and second portions to
8　repair the trouble, wherein the third fiber has an absolute value of dispersion per unit of

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9    length smaller than the absolute value of dispersion per unit of length of the first fiber

10    and the second fiber.

1        21.    A method as in claim 20, wherein, before inserting the third fiber, the

2    first and second fibers are adjacent to each other so that light traveling through the

3    section travels through one of the first and second fibers and then through the other of

4    the first and second fibers.

1        22.    A method as in claim 20, wherein the third fiber has first and second

2    ends and, after inserting the third fiber, the first end of the third fiber is adjacent to an

3    end of one of the first and second portions, and the second end of the third fiber is

4    adjacent to an end of the other of the first and second portions, so that light traveling

5    through the section travels through one of the first and second portions, then through

6    the third fiber, and then through the other of the first and second portions.

1        23.    A method as in claim 21, wherein the third fiber has first and second

2    ends and, after inserting the third fiber, the first end of the third fiber is adjacent to an

3    end of one of the first and second portions, and the second end of the third fiber is

4    adjacent to an end of the other of the first and second portions, so that light traveling

5    through the section travels through one of the first and second portions, then through

6    the third fiber, and then through the other of the first and second portions.

1        24.    A method as in claim 20, wherein first and second repeaters are disposed

2    along the transmission line, the section being defined as a portion of the transmission

3    line between the first and second repeaters.

1        25.    A method as in claim 21, wherein first and second repeaters are disposed

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2    along the transmission line, the section being defined as a portion of the transmission

3    line between the first and second repeaters.

1        26.    A method as in claim 22, wherein first and second repeaters are disposed

2    along the transmission line, the section being defined as a portion of the transmission

3    line between the first and second repeaters.

1        27.    A method as in claim 23, wherein first and second repeaters are disposed

2    along the transmission line, the section being defined as a portion of the transmission

3    line between the first and second repeaters.

        28.    A method as in claim 20, wherein the section is underwater at a depth of greater than or equal to 1000 meters.

        29.    An optical communication system comprising:

        a transmission line having first and second repeaters arranged along the transmission line with no other repeaters between the first and second repeaters, a section of the transmission line being defined as the portion of the transmission line between the first and second repeaters, the section comprising a first fiber having a positive dispersion with respect to wavelength transmitted through the section and a second fiber having a negative dispersion with respect to wavelength transmitted through the section, wherein a third section inserted in the section to repair the section has an absolute value of dispersion per unit of length smaller than the absolute value of dispersion per unit of length of the first and the second fibers.

1        30.    An optical communication system as in claim 29, wherein the third fiber

2    is inserted between the first and second fibers.

1        31.    An optical communication system as in claim 29, wherein, before

2    inserting the third fiber, the first and second fibers are adjacent to each other so that

3    light traveling through the section travels through one of the first and second fibers and

4    then through the other of the first and second fibers.


1        32.    An optical communication system as in claim 30, wherein, before

2    inserting the third fiber, the first and second fibers are adjacent to each other so that

3    light traveling through the section travels through one of the first and second fibers and

4    then through the other of the first and second fibers.


        33.    An optical communication system as in claim 29, wherein the third fiber

has first and second ends and, after inserting the third fiber, the first end of the third

fiber is adjacent to an end of one of the first and second fibers, and the second end of

the third fiber is adjacent to an end of the other of the first and second fibers, so that

light traveling through the section travels through one of the first and second fibers,

then through the third fiber, and then through the other of the first and second fibers.


1        34.    An optical communication system as in claim 30, wherein the third fiber

2    has first and second ends and, after inserting the third fiber, the first end of the third

3    fiber is adjacent to an end of one of the first and second fibers, and the second end of

4    the third fiber is adjacent to an end of the other of the first and second fibers, so that

5    light traveling through the section travels through one of the first and second fibers,

6    then through the third fiber, and then through the other of the first and second fibers.


1        35.    An optical communication system as in claim 29, wherein a trouble in

2    the first fiber divided the first fiber into a first portion and a second portion, the third

3          fiber being inserted between the first and second portions to repair the trouble.

1          36.    An optical communication system as in claim 35, wherein the third fiber
2          has first and second ends and, after inserting the third fiber, the first end of the third
3          fiber is adjacent to an end of one of the first and second portions, and the second end of
4          the third fiber is adjacent to an end of the other of the first and second portions, so that
5          light traveling through the section travels through one of the first and second portions,
6          then through the third fiber, and then through the other of the first and second portions.

1          37.    An optical communication system as in claim 29, wherein a trouble in
2          the second fiber divided the second fiber into a first portion and a second portion, the
3          third fiber being inserted between the first and second portions to repair the trouble.

1          38.    An optical communication system as in claim 37, wherein the third fiber
2          has first and second ends and, after inserting the third fiber, the first end of the third
3          fiber is adjacent to an end of one of the first and second portions, and the second end of
4          the third fiber is adjacent to an end of the other of the first and second portions, so that
5          light traveling through the transmission line travels through one of the first and second
6          portions, then through the third fiber, and then through the other of the first and second
7          portions.

1          39.    An optical communication system as in claim 29, wherein the section is
2          underwater at a depth of greater than or equal to 1000 meters.    *February 8 '01*

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1          40.    An optical communication system as in claim ~~35~~, wherein the section is
2          underwater at a depth of *less* ~~greater~~ than or equal to 1000 meters.

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1      41.    An optical communication system as in claim 37, wherein the section is

2      underwater at a depth of greater than or equal to 1000 meters.

1      42.    An optical communication system comprising:

2      a transmission line having first and second ends and a plurality of sections

3      between the first and second ends so that light travels from the first end, through each

4      of the sections, and then to the second end, wherein

5      at least some sections of the plurality of sections each comprise a first

6      fiber having a positive dispersion with respect to wavelength transmitted through the

7      section and a second fiber having a negative dispersion with respect to wavelength

8      transmitted through the section,

9      a respective section of the plurality of sections, and not being a section

10     of said at least some sections, being formed of an optical fiber having an absolute value

11     of dispersion per unit of length smaller than the absolute value of dispersion per unit of

12     length of the first and the second fibers, said respective section having, arranged along

13     the section, at least one of the group consisting of:

14     a device for splitting light traveling through the section,

15     a device for inserting light into the section,

16     a gain equalizer, and

17     a dispersion compensator.

1      43.    An optical communication system as in claim 42, wherein the optical

2      fiber forming said respective section of the plurality of sections, which is not a section

3      of said at least some sections, is non-zero dispersion shifted fiber (NZ-DSF).

1      44.    An optical communication system as in claim 42, further comprising:

2      a plurality of repeaters arranged along the transmission line, said plurality of

3      sections being defined by the positioning of the repeaters so that a respective section is

4      defined as a portion of the transmission line between repeaters without any other

5      repeaters therebetween.

1      45.      An optical communication system as in claim 43, further comprising:

2      a plurality of repeaters arranged along the transmission line, said plurality of

3      sections being defined by the positioning of the repeaters so that a respective section is

4      defined as a portion of the transmission line between repeaters without any other

5      repeaters therebetween.

6      46.      An optical communication system comprising:

7      a section of a transmission line having repeaters arranged along the transmission

8      line, the section comprising a first fiber having a positive dispersion with respect to

9      wavelength transmitted through the section, a second fiber having a negative dispersion

10      with respect to wavelength transmitted through the section, and at least one fiber other

11      than the first and second fiber, having an absolute value of dispersion per unit of length

12      smaller than the absolute value of dispersion per unit of length of the first and second

13      fibers.

14      47.      An optical communication system comprising:

15      a transmission line having a first section and a second section divided by

16      repeaters arranged along the transmission line, wherein

17      the first section comprises a first fiber having a positive dispersion with

18      respect to wavelength transmitted through the section and a second fiber having a

19      negative dispersion with respect to wavelength transmitted through the section, and

20      the second section comprises a fiber other than the first and second fiber,

21      the fiber having an absolute value of dispersion per unit of length smaller than the

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22     absolute value of dispersion per unit of length of the first and second fibers.

23     48.     An optical communication system as in claim 47, wherein the second

24     section is between a terminal and a respective repeater of said repeaters, with no other

25     repeater between the terminal and said respective repeater.

26     49.     An optical communication system as in claim 47, wherein the second

27     section is underwater at a depth of ~~greater~~ *less* than or equal to 1000 meters.

February 8 '01

T. T. TN